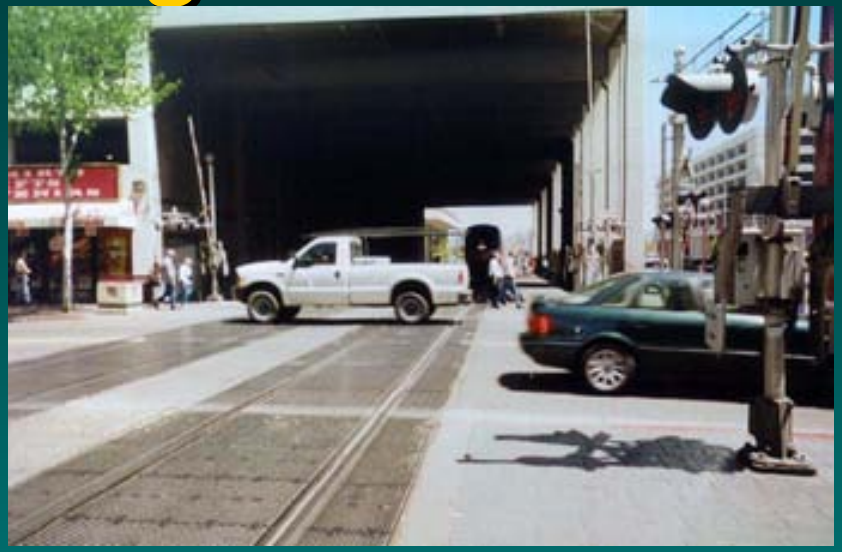
ReTRAC – a Case Study

- Innovation - how structured Task Group sessions improved upon the RFP concepts
- Challenges - how to accommodate the many different interests of all Stakeholders
- Approach - what worked well, and what may be improved
- Lessons learned - before, during, after
- Results: Win-win, a project to be proud of

Reno in 2002 – grade conflicts Virginia Street



Project Details

- ReTRAC Corridor 2.25 Miles Long
- Trench 1.75 Miles Long, 54 Feet Wide, average depth 33 feet
- Trench Pump Station
- Temporary Railroad Shoofly 2.0 miles
- 11 Street bridges across the Trench
- Amtrak Station relocated into the trench
- Utility Relocations – total 230 over, under and around Trench

The Design/Build Team

- Granite Construction Company
  - Nevada Operations
  - Heavy Construction Division

  Project Managers: Jim Laing
  Ron Dukeshier
- Parsons Transportation Group

  Design Managers: Ted Roworth, PE
  Avrum Loewenstein, PE

The Design/Build Team

- Design
  Nolte, Stantec, MSA, Harding ESE, Tobey Wade, VBN, Barajas
- Construction
  Condon-Johnson, Schnabel, Harker & Harker, Martin Iron, PAR Electric
- Public Relations
  Rose/Glenn Group

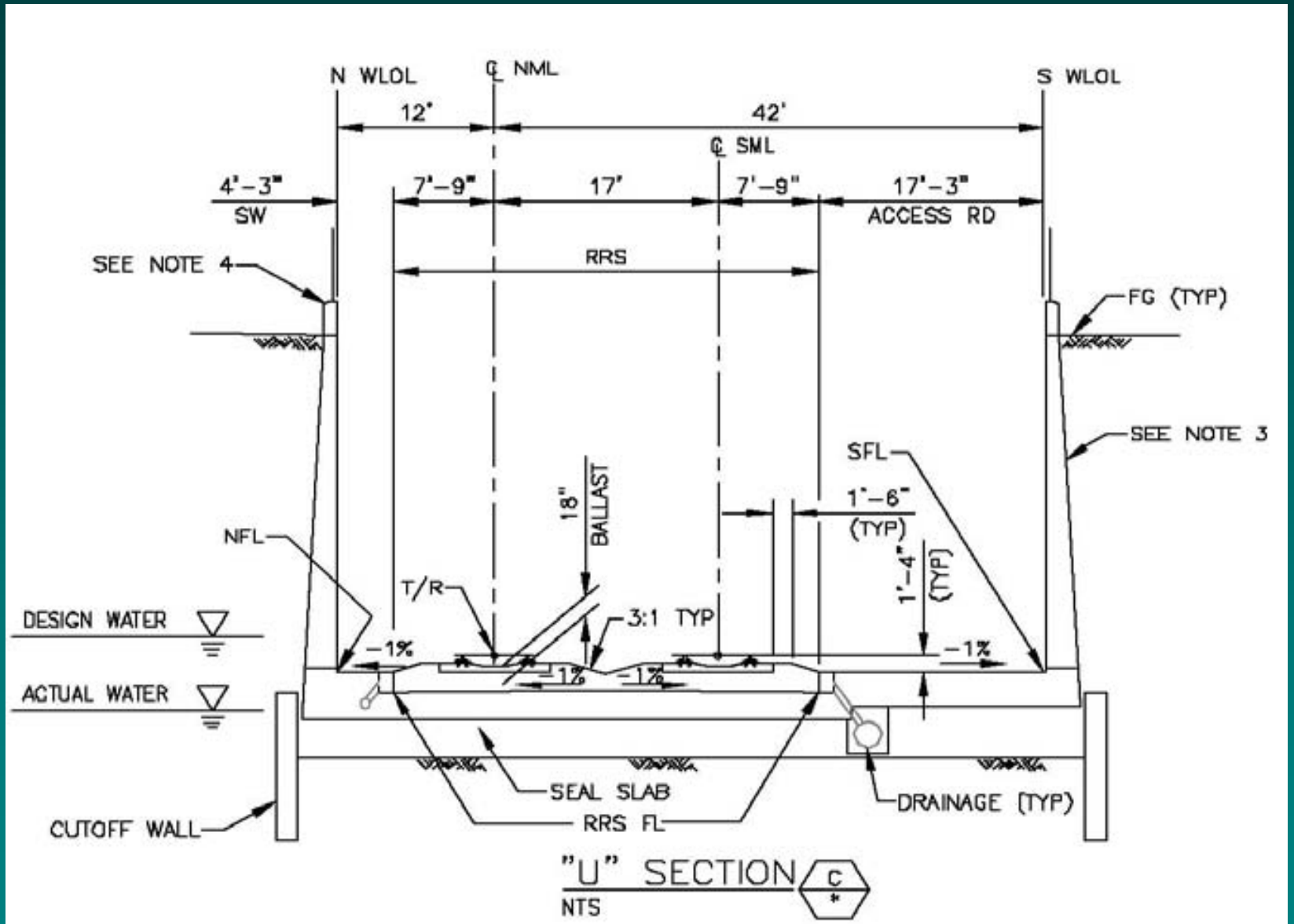
How Task Group sessions improved on RFP concepts

- Explore alternate trench concepts:
  - Cantilever “U” wall v. Strutted Slurry wall
  - Tremie seal below invert v. Jet Grout
- Determine Bridge Type and methods
  - minimize structure depth
  - build bridges first (top down)
  - build bridges fast (re-open street ASAP)
  - build trench from trench (grade separated)

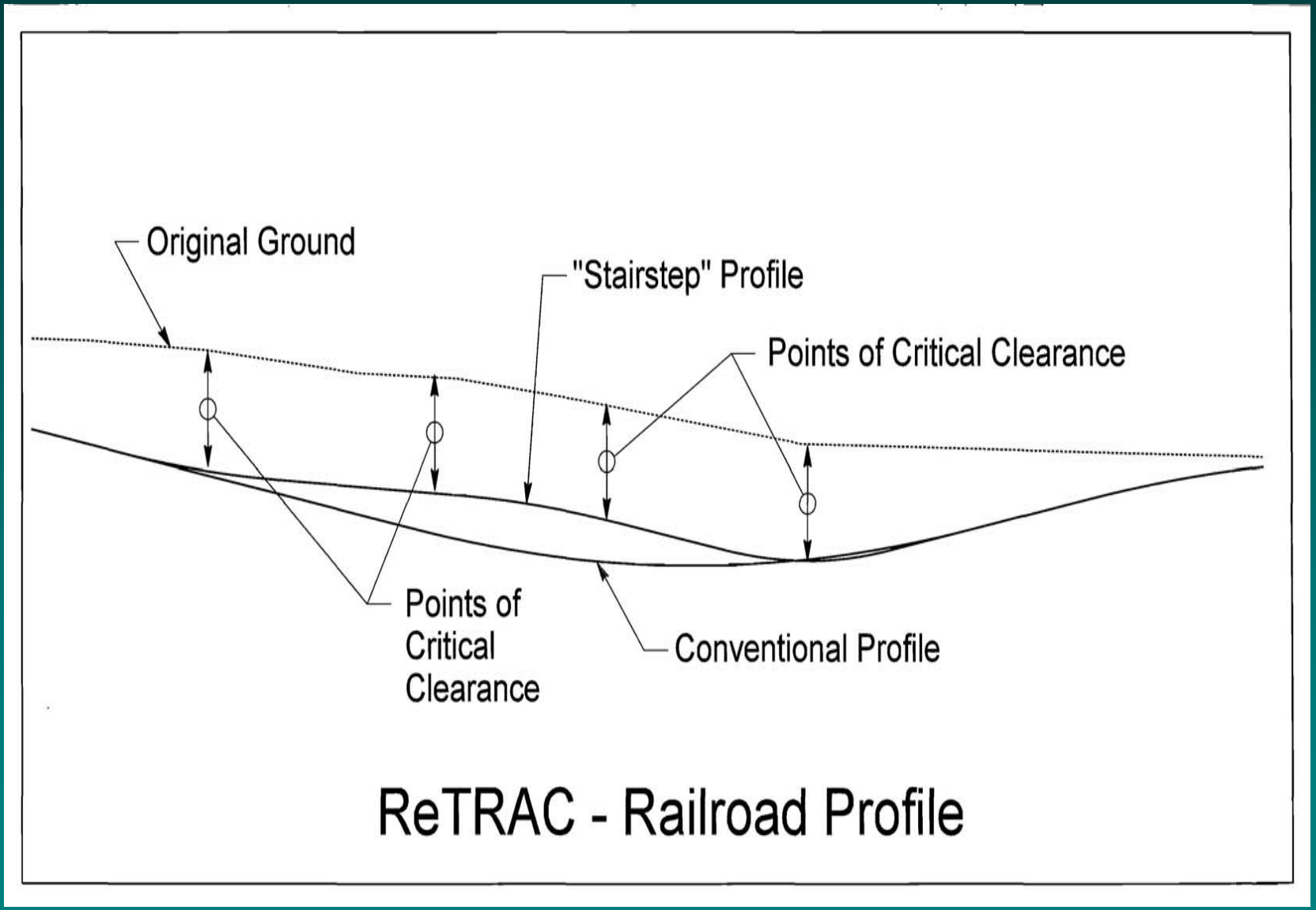
How Task Group sessions improved on RFP concepts

- Develop Alternate Technical Concepts (ATC)
  - raise selected street profiles
  - revise trench profile (“stair step”)
  - eliminate bridge crossing at Evans
  - eliminate pump station – go under, around
  - consider a bridge instead of the trench
- Solve utility, drainage, sanitary issues
  - case by case and one at a time

Cantilever “U” section - no struts

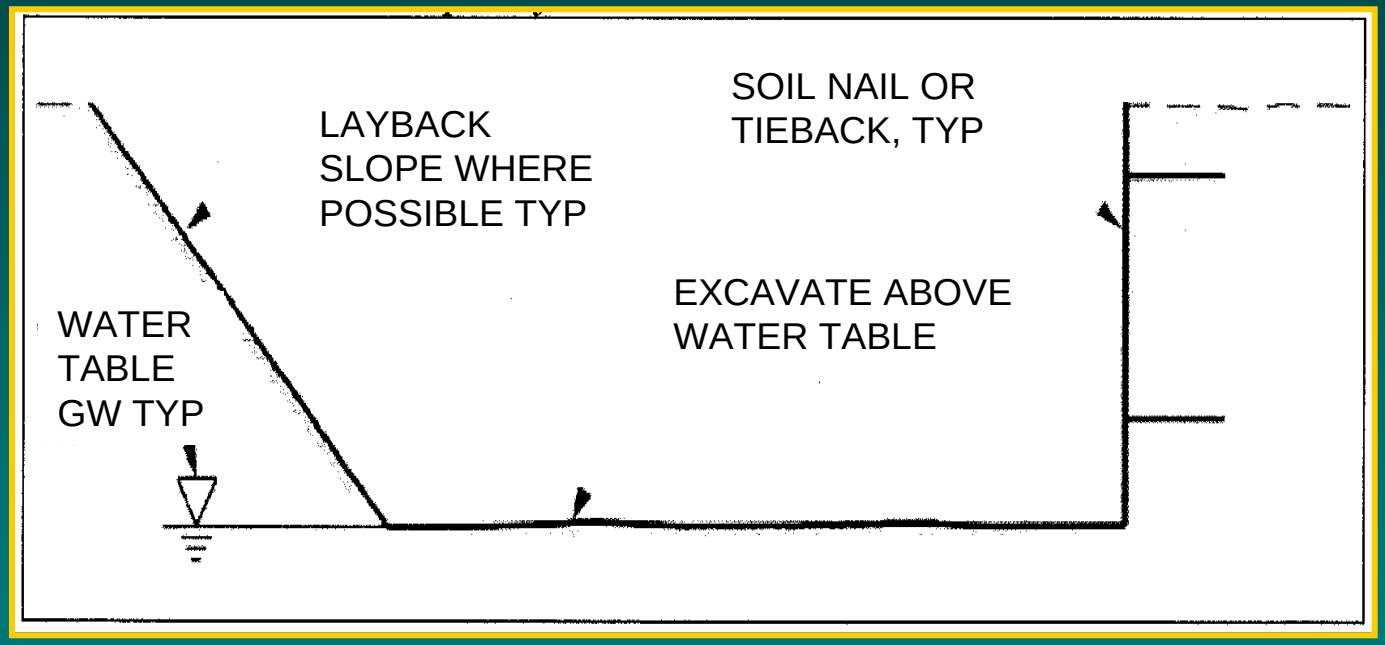


“Stair Step” Profile



Trench Stages – how to build it

- **Stage 1 - Dry Excavation:** Layback as possible or Soil Nail / Tie back to excavate to a point just above the water table:



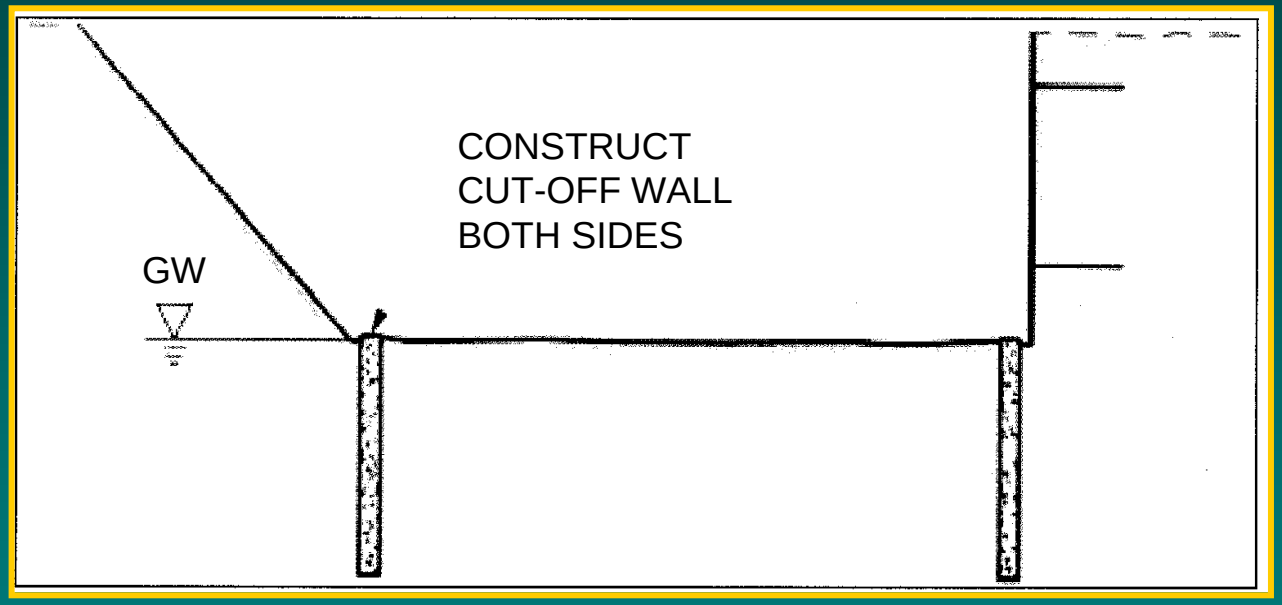
Dry Excavation: **588,000 cy**

Soil Nail Wall Shoring: **200,000 sf**

Trench Stage 1 – dry excavation

Trench Stage 2

- **Stage 2 – Place cut-off walls:** **Install piles** with tie backs as necessary for stability and jet grout to seal



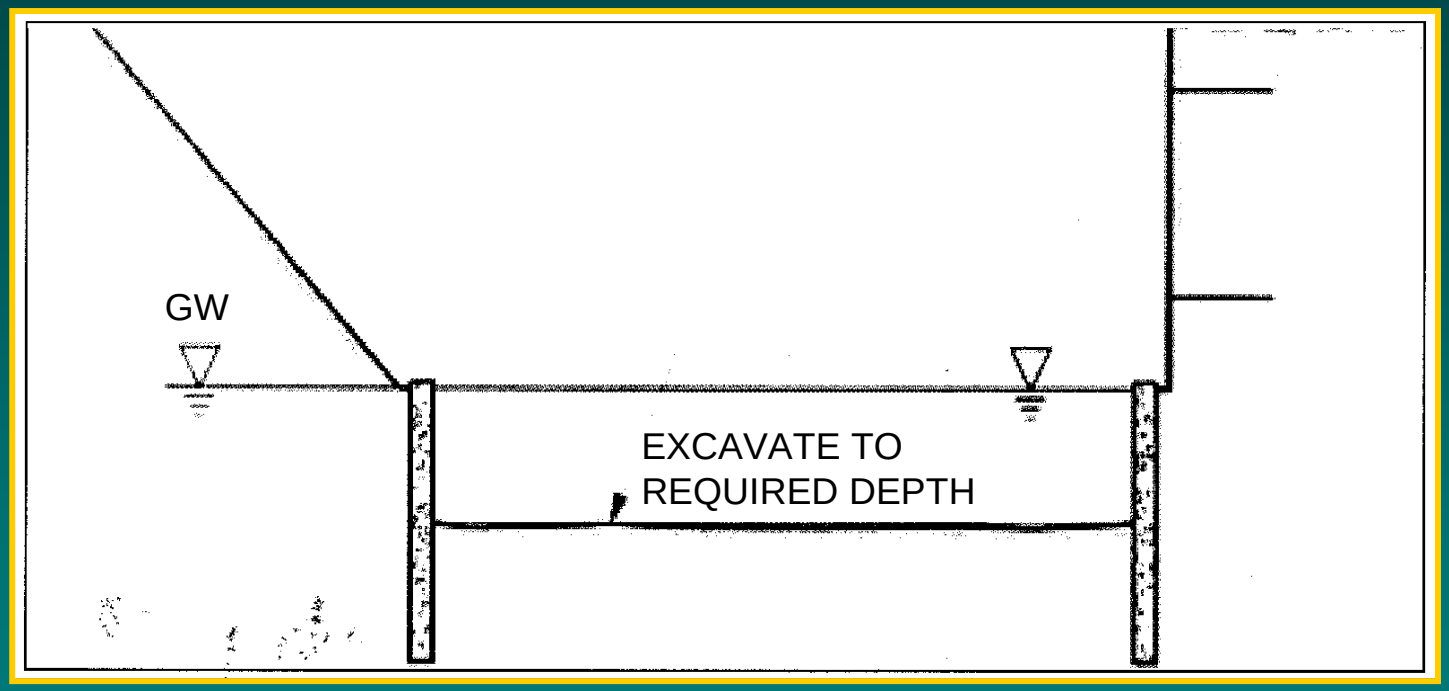
1,050 Drilled Piles (20” Dia), 450 Tiebacks

Piles at 4 Ft on center, with Jet Grout seal between Piles

Trench Stage 2 – cut-off wall

Trench Stage 3

- **Stage 3 – Wet Excavation:** Excavate through ground water to underside of tremie seal slab:

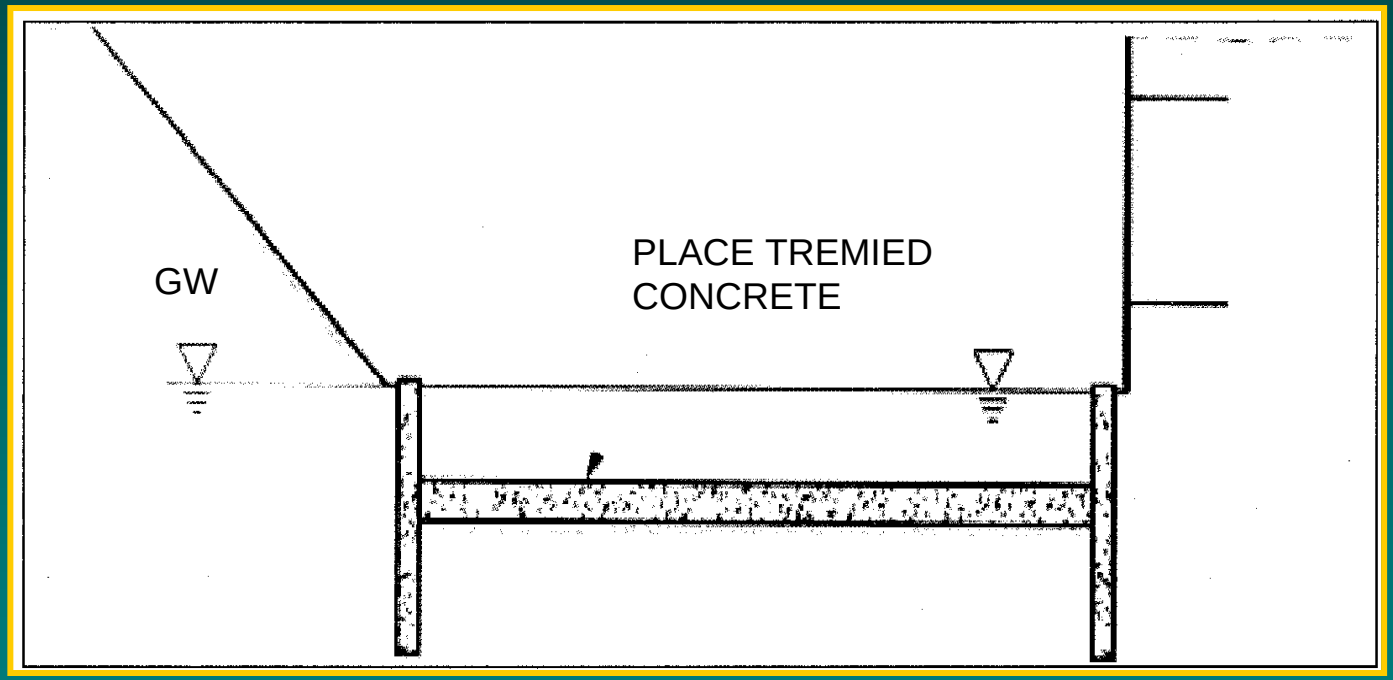


Wet Excavation: **66,000 cy**

Trench Stage 3 – wet excavation

Trench Stage 4

- **Stage 4 – Place Seal Slab:** Place tremied concrete seal slab to create a waterproof concrete seal across the bottom.



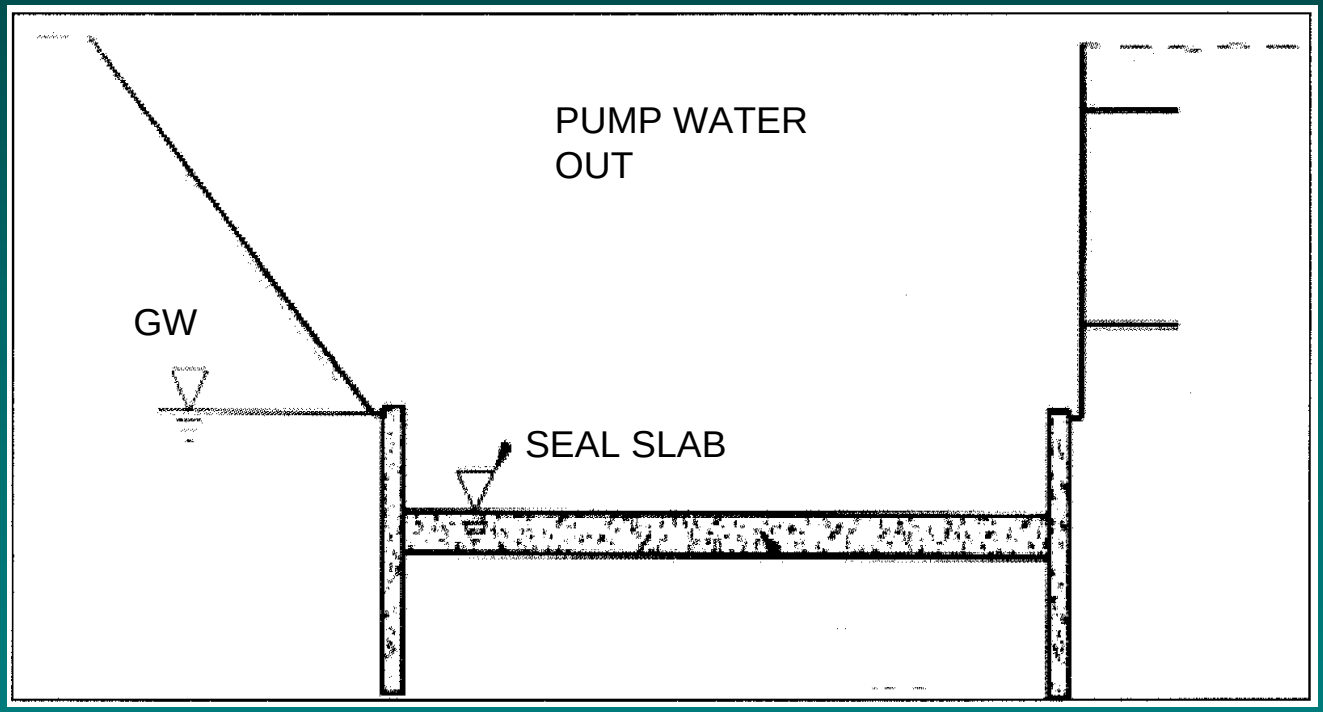
Thickness varies max 3 ft per depth below GW

Seal Slab Concrete: 15,000 cy

Trench Stage 4 – place seal

Trench Stage 5

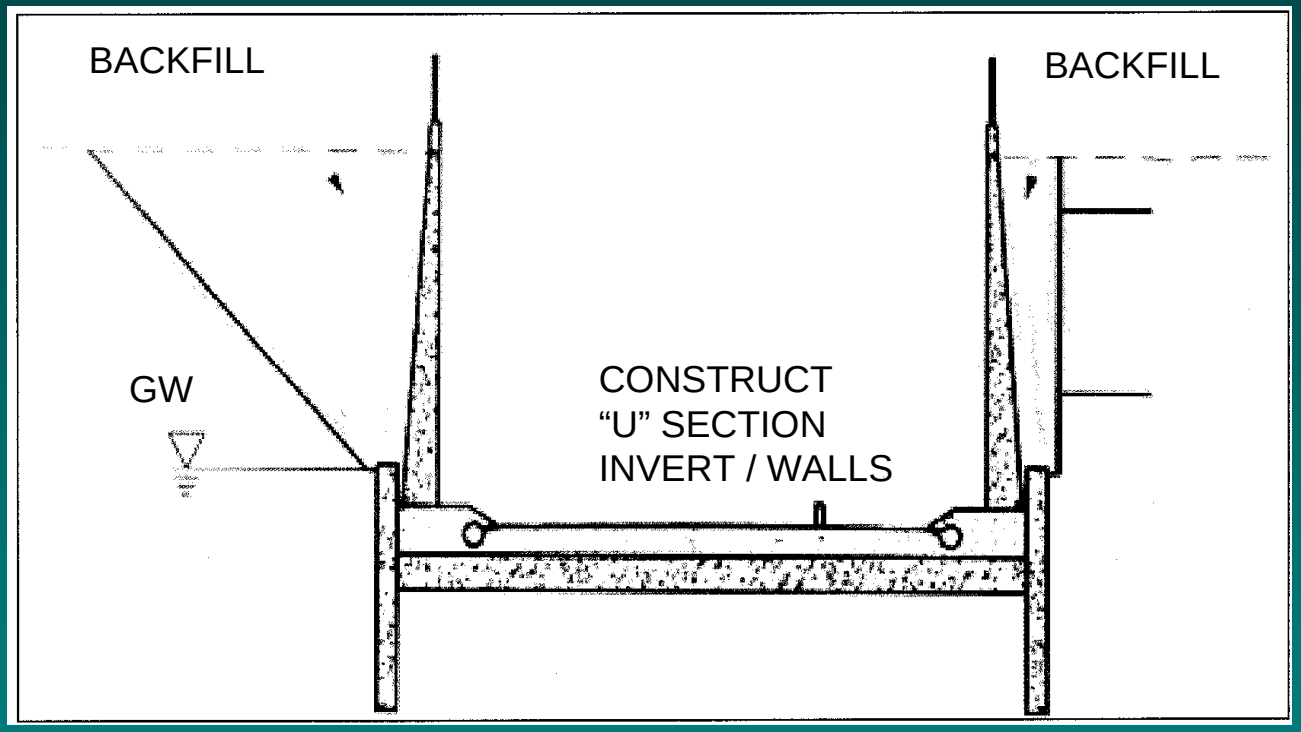
- **Stage 5 – Pump dry:** treat as necessary; construction continues in the dry



Trench Stage 5 – pump dry

Trench Stage 6

- **Stage 6 – Construct “U” section:** Cast Invert slab w/ drain, cast walls, then backfill behind



Total Concrete for Invert Slab and Walls: 64,000 cy
Backfill Material: 140,000 cy

Trench Stage 6.1 – place drain

Trench Stage 6.2 – cast invert

Trench Stage 6.3 – cast walls

Trench Stage 6.4 – backfill

“Trench in a Trench”

Challenges - how to accommodate different interests

- City of Reno
  - complete on budget and schedule
  - sensitive to community, a good neighbor
- UPRR - tailor concepts to comply with Railroad requirements and concerns
- NDOT - meet conventional design-bid-build standards
- FHWA - conform to ROD, EIR and DBE requirements

Challenges - how to accommodate different interests

- Utility Companies - coordinate and schedule related activities
- Community and Business - provide outreach and acceptable traffic staging
- Flood protection - satisfy the 100 yr event and ground water concerns
- Historic Buildings - support in place to avoid potential damage moving them

Public Involvement Program

- Program Goals
  - Keep audiences well informed – E-mail Tree
  - 24-hour information access – 1-800 Number
  - Commitment to address community concerns
  - Website Updates
- Ongoing communications and outreach
  - Stakeholders
  - General community
  - Media
  - Report to City of Reno
  - Accountability: Monthly status

Approach – what worked well

- Co-location - designer, builder, reviewer
- Partnering - success comes from strong communication and clear expectations
  “First try to understand then be understood”
- Design review workshops with UPRR when conventional review methods didn’t work
- Community involvement

Approach - what may be improved

➢ Early agreement on:

- Roles and responsibilities in Design/Build
  - proceed “at risk”
- Proposal concepts and other innovation
  - define process for concept acceptance; details can be finalized later
- Requirements extra to the “core” project
  - existing drainage did not meet 100 yr event

Underpinning Historic Buildings Freight House, Amtrak Bldg

Putting it all together
project success is in the details

Bridge piles
Virginia Street Bridge

Bridge girders
Virginia Street Bridge

Trench excavation below bridge Center Street Bridge

Utility relocation over trench Sierra Avenue Bridge

Utility relocation over trench Washington Street Bridge

Utility relocation under trench Vine Street Siphon

Key dates

- Begin Design pre-NTP July 2002
- NTP September 2002
- Begin Bridge Construction Oct 2002
- Begin Shoofly Construction Jan 2003
- Trains on Shoofly - April 2004
- Begin Trench Construction - May 2004
- Trains in Trench - November 2005
- Project Completion - Spring of 2006

Trench looking east (Jan 04)

Trench looking east (Dec 04)

Trench looking east (Jun 05)

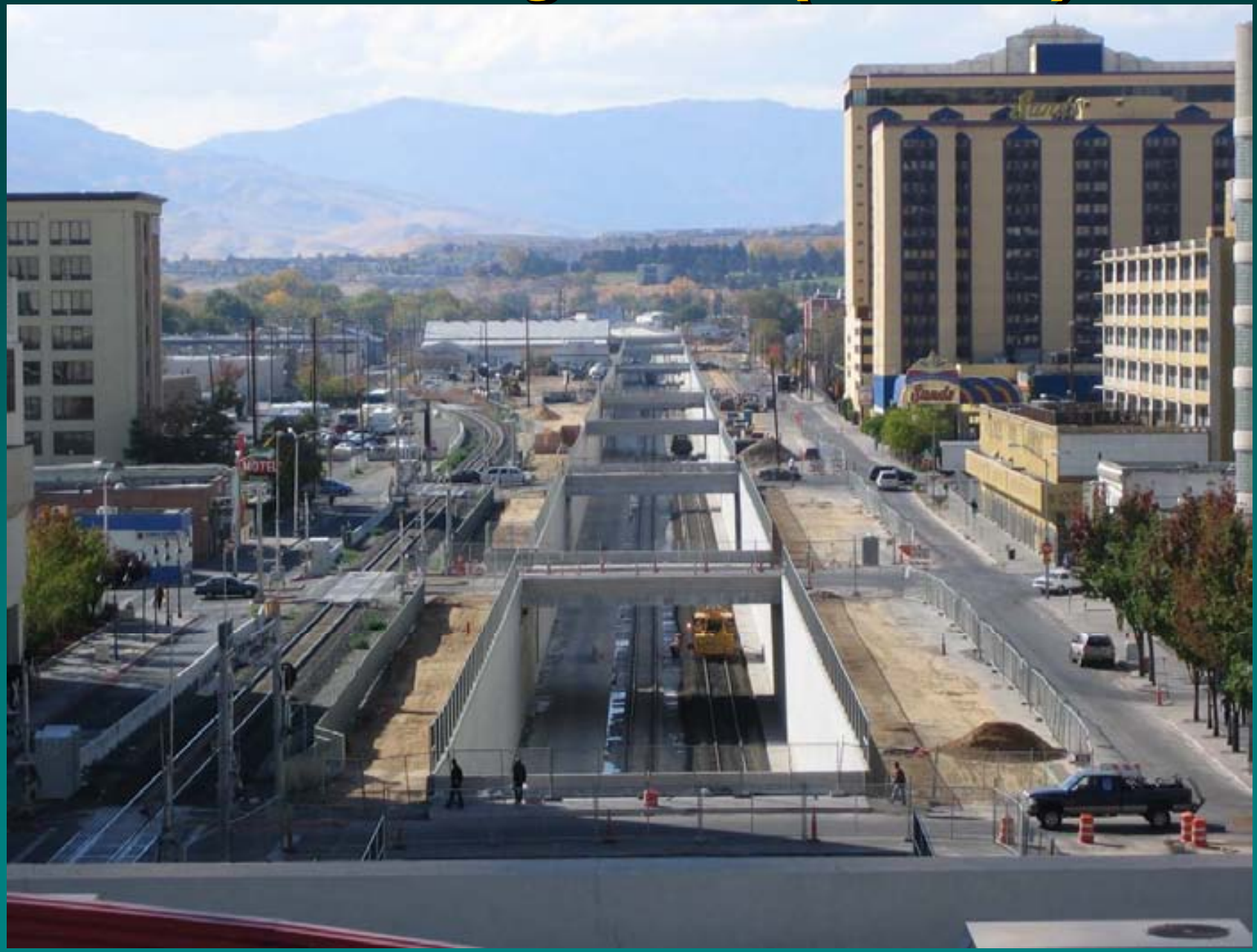
Trench looking east (Oct 05)

Trench looking west (Apr 04)

Trench looking west (Feb 05)

Trench looking west (Jun 05)

Trench looking west (Oct 05)



Lessons Learned – pre-proposal

- Design/Build works best when allowed to provide it's best – this starts pre-proposal . .
- support Owner thru go / no-go decisions
- assist Owner develop the correct project
- advise Owner regarding risk allocation
- address the needs of others
- help Third Party / Stakeholders realize reasonable expectations

Lessons Learned – during bid

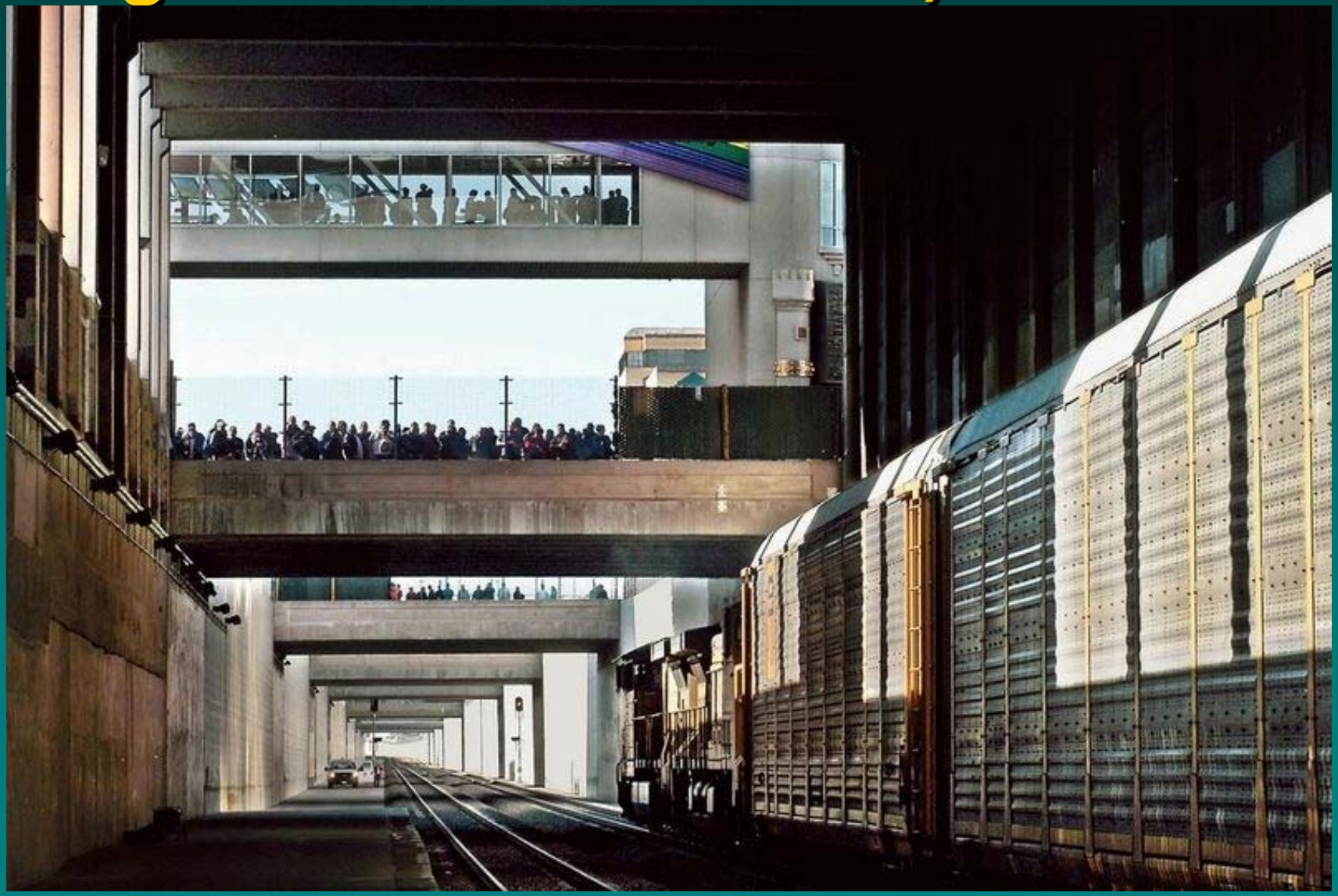
- Design/Build works best when allowed to provide it's best - . . continues through bid . .
- Catch 22 of D/B Technical Provisions
  - what is "preliminary", what is required, and how others may interpret this
- Catch 22 of ATC and pre-bid questions
  - absent stakeholder/third party comments, are there none, or will they be known later

Lessons Learned – in execution

- Design/Build works best when allowed to provide it's best - . . and through execution
- There's always another way - alternative concepts should be considered on merit
- never on who proposes them
- or preferences (if it's not wrong, it's right)
- or "that's not how we've always done it"
- or rigid code compliance (it may not apply)
- but whether it meets performance needs

Reno in 2006 – grade separated Virginia Street

First train in the trench
Virginia Street - Nov 18, 2005



Win-win, a project to be proud of

- Project Success
  - Team delivered per BAFO proposal
- City of Reno got what they wanted
  - project completed early and on budget
- UPRR got what they needed
  - project met their full requirements
- Stakeholders got what they expected
  - no surprises